

CLAIMS

What is claimed is:

1. A traffic communication system wherein a traffic control device comprises:
 - a first traffic management module, for determining a first system variable;
 - 5 a first encoder communicatively coupled to said first traffic management module, for encoding said first system variable as a first signal according to a protocol; and
 - a first transmitter communicatively coupled to said first encoder, for optically transmitting said first signal.
- 10 2. The traffic communication system according to Claim 1, wherein said first system variable is selected from the group consisting of signal setting, signal direction, time to signal change, signal sequence, red light runner alert, signal failure, driver urgency, vehicle presence, absolute vehicle location, toll collection information, speed limit, roadway conditions, traffic impairments, vehicle speed, acceleration/deceleration, 15 braking, lane change with direction and malfunction.
- 20 3. The traffic communication system according to Claim 1, wherein said first transmitter further transmits said signal as one or more selected from the group consisting of an acoustic signal and a radio frequency signal.
4. The traffic communication system according to Claim 1, wherein said first transmitter comprises a light emitting diode or a vertical cavity surface emitting laser.

5. The traffic communication system according to Claim 1, wherein said first transmitter further comprises a lens, for steering an optical output.

6. The traffic communication system according to Claim 1, wherein said first
5 transmitter further comprises a diffraction grating, for diffusing an optical output.

7. The traffic communication system according to Claim 1, wherein said traffic control device consist of one or more devices selected from the group consisting of stop light, a speed limit sign, a traffic advisory message board, a traffic advisory radio station,
10 a street light, a toll gate, a roadside emergency telephone, a stop sign, a yield sign, a route marker, an exit sign, and a traffic camera.

8. The traffic communication system according to Claim 1, wherein a first traffic communication unit, configured to be coupled to a first vehicle, comprises;
15 a first receiver, for receiving said first signal;
a first decoder communicatively coupled to said first receiver, for decoding said first signal to recover said first system variable; and
a first visual display or a first audio alert unit communicatively coupled to said first decoder, for outputting said first system variable.

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9. The traffic communication system according to Claim 8, wherein said first receiver is located on said first vehicle at one or more areas selected from the group consisting of a roof, a windshield, a hood, a headlight, a taillight, a bumper, a trunk, a hubcap, a rearview mirror, a side view mirror and a marker light.

10. A traffic communication system wherein a first traffic communication unit, configured to be coupled to a first vehicle, comprises:

- a first sensor, for receiving a first system variable;
- 5 a first encoder/decoder communicatively coupled to said first sensor, for encoding said first system variable as a signal; and
- a first transceiver communicatively coupled to said first encoder/decoder, for transmitting said first signal.

10 11. The traffic communication system according to Claim 10, wherein said first transceiver comprises one or more of the group consisting of an optical transmitter, an acoustic transmitter, a radio frequency transmitter, an optical receiver, an acoustic receiver, and a radio frequency receiver.

15 12. The traffic communication system according to Claim 10, wherein a traffic control device comprises;

- a third transceiver, for receiving said first signal;
- a third encoder/decoder communicatively coupled to said third transceiver, for decoding said first signal to recover said first system variable; and
- 20 a traffic management module communicatively coupled to said third encoder/decoder, for receiving said first system variable.

13. The traffic communication system according to Claim 10, wherein a second traffic communication unit, configured to be coupled to a second vehicle, comprises:

a second transceiver, for receiving said first signal;
a second encoder/decoder communicatively coupled to said second transceiver,
for decoding said first signal to recover said first system variable; and
a first visual display or a first audio alert unit communicatively coupled to said
5 second encoder/decoder, for outputting said first system variable.

14. The traffic communication system according to Claim 13, wherein said
second transducer of said second traffic communication unit transmits said first signal to
another traffic communication unit coupled to another vehicle outside the transmission
10 range of said first vehicle.

15. A method of communicating a traffic network system variable comprising:
receiving a system variable, by a first traffic communication unit;
encoding said system variable into a signal, by said first traffic communication
15 unit; and
transmitting said signal, by said first traffic communication unit.

16. The method according to Claim 15, wherein said signal is transmitted
utilizing an optical, acoustic or radio frequency means.
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17. The method according to Claim 15, wherein said encoding said system
variable into said signal comprises modulating a synchronized pulse stream according to
a communication protocol.

18. The method according to Claim 15, wherein said system variable is selected from a group consisting of signal setting, signal direction, time to signal change, signal sequence, red light runner alert, signal failure, driver urgency, vehicle presence, absolute vehicle location, toll collection information, speed limit, roadway conditions, traffic impairments, vehicle speed, acceleration/deceleration, braking, lane change with direction and malfunction.
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19. A method of communicating a traffic network system variable comprising:
 - generating a system variable, by a traffic control device;
 - 10 encoding said system variable into a signal, by said traffic control device; and
 - transmitting said signal, by said traffic control device.
20. The method according to Claim 19, wherein said encoding said system variable into said signal comprises applying pulse code dimming wherein a duty cycle of
15 said signal is varied as a function of a light condition.